

## THE SEWAGE SLUDGE DETOXIFICATION

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Recycling of organic sewage sludge today is an urgent problem in the whole territory of Ukraine, which requires a solution. At the most of the municipal wastewater treatment plants, unfortunately, current removal, treatment and recycling of sewage sludge are not properly resolved. At present, the general part of sewage sludge is not carried out. Because it contains toxic chemicals, mainly heavy metals (HM) within the industrial waste water coming into the city sewer system after insufficient treatment or without treatment. As a result, sewage sludge is sent to the sludge pit and storage sites, which are assigned to the large land area. Therefore the process of HM removing from sewage sludge is of paramount importance to allow using sewage sludge as an organic fertilizer in agriculture.

The system of anaerobic microbiological degradation with the deposition of heavy metals by biogenic hydrogen sulfide is a promising orientation of recoverable resources treatment. Biogenic hydrogen sulfide is the product of sulfate-reducing bacteria (SRB). In this direction, biosulfidogenic detoxification sewage sludge together with gypsum waste was developed. Phosphogypsum is the source of sulfates for SRB. They were constantly introduced to the medium of bioreactor during investigations. When sulfate is used to degrade an organic compound, sulfate is reduced to hydrogen sulfide. Phosphogypsum also provides some of the major nutrients. This led to the creation of conditions in which the SRB dominate and inhibit methane-forming bacteria growth. Consequently, phosphogypsum was added to stimulate growth of SRB into sewage sludge.

Organic helatocomplexes with HM were destroyed during the biosulfidogenic treatment. The insoluble metal sulfides such as sulphides of cuprum, iron (marcasites), zinc (sphalerite) and nickel were formed. Efficiency of biochemical HM removal was experimentally substantiated. The ecological pure product was got.

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